

EXHIBIT 10

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Forensic Neuropsychology

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Forensic Neuropsychological Evaluation

Demographic Information

Name: Teed, Aundreya DoB: 05/29/2009 DoE: 6/21/20
Age: 11 years old Education: 5th grade

Referred by: Levy-Konigsberg, LLP

Referral Question: Evaluate for cognitive and emotional impacts of lead exposure

Background

Aundreya Teed is an 11-year-old, right-handed girl of European-American ancestry who has just finished 5th grade. Her mother's pregnancy with her was a fraternal twin pregnancy, and Aundreya was born within normal size/weight limits (2600 g). She takes no current medications or supplements. She has no known allergies. She has four siblings – she and her twin sister are in the middle. There is a family history of ADHD for three of her siblings. Her mother had some anxiety, but it was only treated right around the start of the water crisis.

I reviewed medical records for Aundreya. On 3/6/12, Aundreya was seen for a well-child visit, which was unremarkable. On 9/13/12, Aundreya was seen by Dr. Dolven for itchy scalp. Selenium cream was prescribed.

On 5/20/13, Aundreya was seen by Dr. Dolven for flaky scalp. Selenium cream was prescribed. On 10/17/13, Aundreya was seen by Dr. Dolven for a well-child visit. She was "described as calm, happy, and independent." She had no issues other than taking the selenium for scalp problems.

On 5/6/14, Aundreya was seen by Dr. Dolven for pediatrics, for itchy scalp, and betamethasone and selenium were prescribed. Dr. Dolven's records also included height, weight, and BMI growth charts for the period up to age six, and these were unremarkable.

On 1/12/16, Aundreya had a capillary blood lead level of <3.3 µg/dl.

On 8/15/19, Aundreya underwent a bone lead assessment, with a result of 9.65 µg/g.

Name: Teed, Aundreya

DoE: 6/21/20

Page 2 of 7

I also received academic records for review. During the 2014-2015 kindergarten year, Aundreya's teacher noted in the first marking period that Aundreya had "trouble listening during class sometimes and will be confrontational with other students and the teacher sometimes, as well." She made academic progress, with ongoing attention complaints, and by the fourth period, her teacher opined that she had made some progress on social skills and following directions, with stronger academic progress. During the 2015-2016 year, she was noted to have problems with blurting information out but to also have good academic progress. During this year, her DRA (reading assessment) progressed from 4 to 20. NWEA scores for reading were 160 in the fall and 183 in the spring, and for math, 183 and 205, respectively. During her 2016-2017 school year, her DRA improved from 20 to 28 between 10/2016-2/2017, but then did not improve further (still 28 6/2017). She had small NWEA reading gains (168 to 183) and larger for mathematics (178 to 216). During the 2017-2018 school year, Aundreya had generally lower grades in math than in other subjects, with a D+ for the first two marking periods in math, improving to a B (reading was also a C+ improving to an A-). Her teacher noted that she had a DRA (reading assessment) at the end of term, which was 40F, which was deemed at grade level. During the 2018-2019 school year, Aundreya received variable letter grades on a standard A-F scale – this varied by marking period and subject, although by the end of the year, all grades were As or Bs (prior to this, mathematics was notable for having been in the D+ to F range). Her MAP assessment that year also included historical records since fall 2016. On that assessment, mathematics was consistently within normal limits, with percentile ranging from 47th to 95th percentile during this timeframe. Reading ranged from the 33rd to 51st percentile.

I also reviewed Aundreya's Plaintiff's Fact Sheet, dated 7/10/19. Alleged on her behalf were "cognitive deficits, shame, ... aggressive behavior, loss of concentration, and an inability to focus."

Ms. Apricott Teed, Aundreya's mother, was deposed on 1/14/20. With respect to their home at the time of the Flint water crisis, wall paint appeared to be relatively new when the family moved into the home, without paint chipping or peeling. She noted tap water discoloration and odor during the crisis, and she noted that Aundreya had consumed tap water. She noted that Aundreya had consumed this from the sink as well as from an outdoor hose. In response to the latter, she noted, "We took the hose away and left the spigot and they drank out of the spigot" (in reference to Aundreya and her siblings). She noted worsening of skin rashes and changes in appetite during the period in which Flint River water was used. Ms. Teed noted that they did not routinely use bottled water (but did keep some in their home) until officials began making bottled water available to residents during the crisis. After that, they did also continue to ingest tap water when bottled water was not available, and they also continued to use it for cooking, bathing, dishwashing, and washing clothes. Ms. Teed reported that she was not able to install a filter because it would not fit with their kitchen sink faucet, and that she had been told a company "was going to replace the water faucet for us so that it would fit, but they never contacted back again and they didn't leave information to contact them." Ms. Teed opined that Aundreya tended to do worse in history than other academic subjects, and she reported that Aundreya had tested below expectations in reading as well, although she appeared to have improved after changing schools. Ms. Teed noted that Aundreya has problems with focus, not completing assignments, disruptive behavior, and peer social problems. She noted that she had consulted a behavioral health specialist, Dr. Chetta, for Aundreya's siblings, but not for her.

Interview

Name: Teed, Aundreya

DoE: 6/21/20

Page 3 of 7

Aundreya was accompanied by her mother to my office. I obtained examinee informed consent directly, and I explained the medicolegal nature of this examination, including the limited doctor-patient relationship between the examinee and myself, and that as a result I would not be providing feedback or making recommendations today. I evaluated the examinee in a private, quiet, 1:1 environment, per standardization guidelines.

I reviewed early developmental history with the family. Aundreya was an easy baby. She had good muscle tone. She had on-time basic motor development. She learned to ride a bicycle without training wheels around age 8 years. Early speech was also fine. She also had normal early nonverbal skills, including eye contact, joint attention, communicative facial affect, and gestures. She had normal play interests.

More recently, Ms. Teed noted that the current school year was chaotic with the COVID-19 pandemic. Aundreya felt she was generally doing well academically, and math was easy. She was at West Bendle this year. They may actually be moving this year, and Aundreya may be at a new school in the fall, but this has not been finalized, yet. She does not have an idea of what she would like to do yet, in the future, such as a career or other aspiration. Ms. Teed noted that Aundreya has variable grades, but not in any clear pattern. If anything, most recently, she does not like gym class as much. She has pretty good memory, without any unusual forgetfulness compared to other youth her age. She has decent focus. She tries to get her homework done on the bus, so she will not have to do it at home. Aundreya follows two-step related directions consistently, but not really unrelated two-step directions or three-step directions without reminders. She is a good drawer and builder.

Emotionally, Aundreya's mother thinks that problems surfaced with the water crisis and lead exposure. She was a smiley, happy baby. She was always really friendly – even hugging strangers. After the water crisis, she seemed to have a change in personality – wanting to be left alone, disengaging (as Aundreya noted, "I want to watch Netflix!"). Since then, she is moody or volatile – she is happy sometimes, but she gets angry or upset a fair amount and is also unmotivated, needing a lot of nagging. This can even relate to things like getting on her to change her clothes or take showers, still. If anything, she is getting worse over time, and with her entering her teenage years, her mother feels there is some overlay of adolescence issues also. She does not have tantrums per se, but she has defiance, talking back, or there might be some screaming before she does something she is asked to do. She is a little scared of the dark, but otherwise, there is no unusual anxiety. Otherwise, there are no major emotional concerns. Her mother wonders sometimes if she might bully other children – there is one girl with whom she has a mutually bad relationship. She does have good friends – including a friend she has had since first grade.

Aundreya's vision and hearing are good. She complains sometimes of weak sense of smell – this has been like that for a long time (and apparently, she had never mentioned it to her mother). She is not picky, but she does not really eat a lot unless her mother makes sure she eats. She sleeps okay in general, although the schedule is off with COVID-19. She does not snore. She does not have any pain concerns.

Functionally, she can dress herself, take her own showers, etc., but she needs nagging. She can clean her room, but she needs to be prompted. She can earn and save money.

Observations

On informal observation, Aundreya was a casually dressed, normally groomed girl of average to lanky height/build. She ambulated independent and did not have any motoric abnormalities. She made fluid, well-modulated eye contact. She used a variety of means to demonstrate social reciprocity, including use of spontaneous descriptive and emphatic gestures, and offering information about her experiences as well as asking about mine. She was euthymic and cheerful today. Her activity level was not overly elevated, but she was mildly disinhibited and impulsive at times. She did have some fidgeting. Her speech was normal for rate, rhythm, prosody, and complexity of content, although her psychological insight was on the weak side for her age and cognitive level. She could chime in and offer her perspective on things when I was interviewing her mother. She maintained adequate task engagement without any unusual need for breaks during formal testing, and her performance on measures of effort in testing was also acceptable. These results are valid and interpretable.

Test Results

On a measure of overall intellectual functioning (WISC-V FSIQ= 103), Aundreya performed in the average range. She had weaker performance on verbal reasoning (VCI, driven down by poor SI performance), and this was low average. This could potentially be consistent with a left hemispheric deficit (since language skills are lateralized to the left hemisphere in most right-handed individuals) or to a verbal learning disability, and so I looked more closely for any signs of lateralized impairment. Motor functioning was not lateralizing (GPT). Academic functions were, but in the *opposite* direction I would expect from the WISC-V – that is, mathematics (typically more associated with right-hemispheric functions) was low average, and well below reading ability (WRAT-5). This was, again, a fairly large discrepancy, with reading comprehension well above grade level and mathematics well below grade level. Verbal memory (CVLT-C) was also intact. So, this does suggest a complex pattern of strengths and weaknesses, but not a clearly lateralizing one.

I also examined frontal/executive functions in detail. In general, in addition to normal motor dexterity (GPT), most basic speeded tasks were also intact. On the easier aspect of a visual scanning task (TMT-A), Aundreya became “stuck” with an error, significantly slowing her performance, but she did better when divided attention demands were imposed (TMT-B), and other speeded tasks were also normal (CD). Focused attention was good (DS). While basic sustained attention (NEPSY-2 AA) was also acceptable, when vigilance demands were added (RS), she began making a number of omission and commission errors, so that this was overall impaired. She did fairly well on a multi-step problem solving task (TOL-DX). Overall, she did not show a broad pattern of executive deficits, but she did have problems with aspects of higher-level attention.

Adaptive functioning on the Vineland-3 was borderline, suggestive of generally weaker independence skills than Aundreya’s cognitive level would suggest (FSIQ>ABC). I had Ms. Teed complete the BASC-3 to assess behavioral and emotional functioning. Her biggest concern was a lack of social skills, and consistent with her interview report, she suggested some current social withdrawal, with lesser concerns about a lack of adaptability and some mild aggression/mood problems.

Test Results, Tabulated

Name: Teed, Aundrea

DoE: 6/21/20

Page 5 of 7

NV-MSVT

IR= 100.0 DR= 100.0 CNS= 100.0
DRA= 100.0 PA= 100.0 FR= 70.0

WISC-V

Verbal SI= 5 VC= 10
Vis/Spat BD= 14
FI Reas MR= 11 FW= 11
Wk Mem DS= 12
Pc Spd CD= 10
Indices VCI= 86 FRI= 106 FSIQ= 103

WRAT-5 (Blue; age norms)

Word Reading= 107 (GE= 7.1)
Math Computation= 86 (GE= 4.0)
Sentence Comprehension= 117 (GE= 8.9)

GPT

R/Dom= 73", 0 drops, Z= -0.4
L= 80", 0 drops, Z= -0.5

TMT

A= 30", 1 err, Z= -1.8
B= 46", 1 err, Z= -0.5

CVLT-C

Trial 1= 6, Z= -0.5 Trial 5= 10, Z= -0.5
Tot. Lng= 43, T= 44 Trial B= 9
SDFR= 8, Z= -1.0 SDCR= 9, Z= -0.5
LDFR= 10, Z= 0 LDCR= 9, Z= -0.5
Hits= 15, Z= +1.0 FP= 0, Z= -1.0
RDI= 100%, Z= +1.0

TOL-DX

TMS= 104 TCS= 106
RVS= 104 TVS= 110
IT= 98 ET= 96 PST= 96

NEPSY-2

AARS: AA Correct= 30, ss= 13
Commissions= 0, 51st-75th %ile
Omissions= 0, >75th %ile
Combined ss= 13

Name: Teed, Aundreya

DoE: 6/21/20

Page 6 of 7

RS Correct= 27, ss= 6

Commissions= 4, 11-25th %ileOmissions= 6, 11-25th %ile

Combined ss= 6

Vineland-3

COM= 72

DLS= 81

SOC= 82

ABC= 79

Int= 19 / Ext= 18

BASC-3

PRS Ext= 49 Int= 46 BSI= 58 Adap= 35

Conclusions

Aundreya presents with a complex pattern of discrepant skills across cognitive domains, which are masked by an overall normal intellectual level. Although not overt deficits from a psychometric standpoint, she has relative weakness in verbal reasoning in comparison to other broad intellectual domains, and in mathematics compared to other academics, and these are both large discrepancies – in the case of the academic discrepancy, it is a difference of two full standard deviations. She does have deficits in higher level attention but does not present with a pattern that is really consistent with attention-deficit/hyperactivity disorder (ADHD). Emotionally, she also presents with some social and mood problems. I would characterize the former as a neurocognitive disorder and the latter as a mood disorder. There is no evidence of these issues prior to the change in the Flint, MI water system to the Flint River, and her exposure is consistent with known distributions of lead exposure resulting from the water system change (Hanna-Attisha, LaChance, Sadler, & Schnepf, 2016). In Aundreya's case, she had a negative capillary blood draw, but no apparent follow-up testing until her more recent bone lead level. That measure, when measurement error is taken into account, suggests a moderate cumulative/long-term exposure to lead. Her impairments in mood and cognition are consistent with the range of impairment seen in exposure to lead (Lidsky & Schneider, 2006; Mason, Harp, & Yan, 2014), and researchers have demonstrated that even low lead exposure can lead to negative outcomes (Vorvolakos, Arseniou, & Samakouri, 2016; Hou, Yuan, Jin, *et al.*, 2013). Given the correspondence of the time course of her problems and the nature of her problems with her lead exposure, it can be determined with a reasonable degree of medical certainty that her cognitive and mood problems are the result of her lead exposure.

Diagnosis

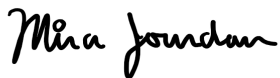
Overall, my primary diagnostic impression is neurocognitive disorder (G31.84) and mood disorder (F39) resulting from lead exposure.

Recommendations

1. Intellectually, Aundreya generally has the cognitive capacity to succeed. She does present with a pattern of scattered, mild cognitive deficits. With substantial discrepancy between her strong reading skills and her mathematics ability, which is nearly two grades behind her actual grade placement, as well as problems with activity level and attention, she requires special education supports under an individualized education plan, consisting of resource room support / tutoring for mathematics. She should also receive accommodations in the form of a private testing environment and extended time on tests.
2. While IQ at the current age is not completely predictive of long-term outcome, Aundreya's attention and learning problems do increase her risk for negative outcomes such as dropout or performing below her potential. Overall, I would estimate her likelihood of not graduating high school to be low (<25%), but there is a moderate possibility that these issues may prevent completion of college or graduate training (30-50%) and may prevent her from success in a skilled vocation (that is, reducing her work to simple, unskilled work below her potential if her learning and attention issues were not a concern).

Attestation

I personally completed all aspects of this evaluation, which included: review of medical records, interview with and examination of the examinee, testing, integration, complex decision making and interpretation of results, and this report. I have no prior relationship with the examinee and am unaware of any conflicts of interest for this examination.



8/4/2020

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